Patent claims

1. A drive device, in particular a robot arm (4) for a robot (R) which, if appropriate, is connected to a main drive (1) via at least one arm (2) such that it can be moved,

wherein the robot arm (4) has a plurality of drive motors (M_1 to M_3) for swiveling the housing (5) and, if appropriate, for driving a spindle (6).

2. The drive device as claimed in claim 1, wherein the drive motors (M_1 to M_3) are inserted into the housing (5) in an integrated manner.

3. The drive device as claimed in claim 1 or 2, wherein the drive motors (M_1 to M_3) are integrated in receiving openings (14.1 to 14.3) of the housing 5 and are optionally designed as a shrunk or releasable connection.

4. The drive device as claimed in at least one of claims 1 to 3, wherein each drive motor (M_1 to M_3) is assigned a transmitter element (13), in particular a resolver, encoder or absolute value transmitter.

5. The drive device as claimed in at least one of claims 1 to 4, wherein an electromagnetically operated braking device (12) is assigned to the drive motor (M_1).

6. The drive device as claimed in at least one of claims 1 to 5, wherein the housing (5), in particular the robot arm (4), is connected to the arm (2) such that it can be swiveled about an axis (A_2), the drive motor (M_2) controlling a swiveling movement of the robot arm (4) with respect to the arm (2).

7. The drive device as claimed in at least one of claims 1 to 6, wherein in each case the two further drive motors (M_1 and M_3) are arranged close by in the region of the drive motor (M_2).

8. The drive device as claimed in at least one of claims 1 to 7, wherein a drive disk (9) of a linear guide, in particular spindle (6), can be driven by the drive motor (M_1) by means of a transmission element, in particular belt element (11).

9. The drive device as claimed in at least one of claims 1 to 8, wherein the linear guide, in particular the spindle (6), is constructed as a threaded spindle, in particular as a recirculating-ball spindle (7) having a groove (10) running in the longitudinal direction.

10. The drive device as claimed in claim 8 or 9, wherein the drive disk (9) engages in the groove (10) and, by means of being driven in rotation by the drive motor (M_1), permits a rotational movement of the spindle (6) about an axis (A_4).

11. The drive device as claimed in at least one of claims 1 to 10, wherein, in order to carry out a lifting movement, a lifting disk (16) engages with the drive motor (M_3) via a transmission element, in particular belt element (11), at least one ball element or pin element engaging in spindle-like recesses in the spindle (6) in order to carry out a lifting movement as a result of rotation of the lifting disk (16).

12. The drive device as claimed in at least one of claims 1 to 11, wherein the drive motors (M_1 to M_4) are inserted into the housing (5) of the robot arm (4) in an integrated manner.

13. The drive device as claimed in at least one of claims 1 to 12, wherein the main drive (1) has a drive motor (M_5) which drives the arm (2) about an axis (A_5).

14. The drive device as claimed in at least one of claims 1 to 13, wherein motor shafts of the drive motors (M_1 to M_3) are mounted in the housing 5, in particular inserted.

15. The drive device as claimed in at least one of claims 1 to 14, wherein stators of the drive motors (M_1 to M_3) are inserted into the receiving openings 14.1 to 14.3 in a fixedly integrated or re-detachable manner.